but to shoot the dog. My host was unwilling for me to 'waste' a shot, however, and since it was his animal I was unable to do more than sympathise with the suffering beast. The dog lingered about the ranch house for four or five days, until one morning it suddenly arose, tottered for a few steps and fell dead.

The second case did not come under my personal observation, but I heard its details in 1949 in Tampa, Florida, and have no reason to doubt their truth. In this instance a Brown Pelican, *Pelecanus occidentalis occidentalis*, had dived for a large fish and succeeded in obtaining it in its pouch. The fish was too large to be swallowed. The pelican was unable to disgorge the fish, for the dimensions of its prey were greater than the widest degree to which the bird could spread its flexible mandibles. Apparently the force of the dive and the impact with the fish were great enough to over-distend the mandibles, but the pelican could not work up an equal counter force to eject the fish.

After the bird had spent several days at one spot on the water, being unable to arise in flight and also acting in abnormal fashion, its behaviour aroused the curiosity of some local fishermen. They were able to capture the bird. Charged with humanitarian instincts, they removed the fish from the pelican's pouch and released the great bird. It was weakened from hunger and could not launch itself in flight. The fishermen left the bird to its natural reactions, and the next day it had disappeared. Whether it recovered from its experience or had died no one knew.

Now some one else must take up the thread of these fish stories.

BANGALORE, C. BROOKE WORTH
November 5, 1951.

28. USE OF FISH SLIME IN STRUCTURAL ENGINEERING

Fish by-products such as fish liver oil, fish meal, fish manure, isinglass, glue, and a host of others are fairly well known. What is perhaps not so well understood is the use of fish slime or mucus for extra strength in the construction of big buildings.

The mucus in question is the one obtained from the body of *Ophicephalus* spp.—'Braal' (Malayalam). Generally the bigger varieties such as *O. striatus* and *O. marulius* are used. The mucus is obtained in the following way: Living specimens are put into a large mouthed copper vessel (about 5 ft. in diameter and 1 ft. in height) with water. The quantity of water is determined with reference to the number of specimens available. Three or four specimens with every gallon of water gives the proper quantity of glue. The fish are kept in the vessel for two or three days. Their movements in the limited quantity of confined water causes the slime on their bodies to enter into solution with the water. This solution is viscous and sticky. A certain amount of the slime settles down at the bottom. This assumes a dull greenish hue. When the solution is found to be sufficiently sticky the specimens are removed, and the solution stirred well. Locally this mucus solution is known as *'Braal pascha'*.

When available in large quantities fish slime is used in the preparation of mortar or in plastering. Structures built with mortar prepared in this way have an extra adhesive strength and do not give way under ordinary conditions. In the construction of domes and other arched structures, *Ophicephalus* mucus is of special importance. It is said that many of the old churches in Travancore-Cochin with arches and domes were built using *Ophicephalus* mucus. The use of this is not so common now as of old, presumably because *Ophicephalus* specimens are not obtained in sufficient numbers for large scale constructions.

Ophicephalus is considered excellent eating all over India. It forms the mainstay of the natural pond fishery in South India. It is cultured in several parts of India and is esteemed as excellent food for convalescents.

Ex-Fishery Trainee,
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November 12, 1951.

29. SWARMING OF BUTTERFLIES

While out in the jungle the other day, in hilly country some 60 miles NNW. of Madras I came across enormous swarms of a lycenid butterfly. They were settled along two miles of a red earth forest road in such profusion that there were large patches of grey all over the road.

I estimated there were some patches 10 yards long by the whole width of the road which was about 10 ft. wide, and each patch must have contained tens of thousands of butterflies.

The road was dry but not dusty and there had been rain the week before.

I enclose a specimen of this butterfly and would be very grateful if you will identify it for me.

Incidentally there were smaller patches of other butterflies in the vicinity, notably *Graphium nomius nomius* (twenty to thirty in a group), *Graphium doson eleius, Catopsilia crocale, Appias libythea libythea,* and *Papilio demoleus demoleus*.

In the same place last year in September I came across enormous numbers of *Papilio polytes romulus* ♂♂ all drinking on damp ashes. On this occasion I flopped my net on one patch and caught 57!

c/o Grahams Trading Co. (India) Ltd.,
310/11 Linghi Chetty Street, A. E. G. BEST
Madras,
July 27, 1951.

[The specimen has been identified as *Chilades laius laius* Cr., the Lime Blue. It has a practically overall Indian distribution.—Eds.]